

Health promotion interventions in type 2 diabetes

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Abstract

Aim. To present the most common quality criteria in health promotion interventions in type 2 diabetes mellitus (T2DM).

Methods. A systematic literature search was conducted to identify review articles, health technology assessments and policy reports of evaluated health promotion interventions in T2DM. A descriptive analysis of study characteristics and evaluation criteria are presented.

Results. Seven studies met the inclusion criteria. The findings indicate that the most common health promotion interventions used in T2DM are initiatives targeting health care professionals. The main ambition of the programs was to increase the collaboration between health care professionals and patients, and between health care centres, program managers and community stakeholders.

Conclusions. This investigation extends our knowledge of the most common health promotion interventions in T2DM and which structure, process and outcome measurements that are reported in such interventions. Future research could usefully explore how the effectiveness of multicomponent and complex interventions may be evaluated and extend the association of these factors into other settings and in relation to other lifestyle related chronic diseases.

Key words

- health promotion
- diabetes mellitus
- type 2
- quality indicators

INTRODUCTION

Type 2 diabetes mellitus (T2DM) constitute a major and growing burden on health care systems globally [1]. People with chronic conditions are their own principal caregivers and health care professionals, regardless of degree of specialization, ought to act as consultants supporting patients in their self-management role. Diabetes is a social problem that demands for re-education and reorientation of health care professionals and health care settings, readiness from policy makers and relevant stakeholders, as well as robust national policies and strategies developed, owned and monitored by national authorities.

Health promotion, as defined by the Ottawa Charter for Health Promotion in 1986 [2], refers to the process of “enabling people to increase control over, and to im-

prove, their health”. In the 4th International Conference on Health Promotion in 1997, The Jakarta Declaration was set out, and gave the following five key prerequisites of success for health promotion strategies [3]:

- build healthy public policy;
- create supportive environments;
- strengthen community action;
- develop personal skills;
- reorient health services.

Health promotion strategies in T2DM may consist of one or a combination of programs targeting health- and dietary education, self-management, psychological support, or constitute initiatives targeting health care professionals or community stakeholders, and in addition have an intention to increase partnership across sectors. Also, patient empowerment is an upmost im-

portant and central topic in health promotion interventions. The EU-funded *EMPHATiE* project [4] defines patient empowerment as follows: [...*patients to become "co-managers" of their condition in partnership with health professionals; and to develop self-confidence, self-esteem and coping skills to manage the physical, emotional and social impacts of illness in everyday life*].

Mechanisms that explain success or failure of such initiatives remains mainly unclear or unknown, as there exists no consensus or validated framework to evaluate the structure, process and outcome indicators among complex interventions. Even more so, patient perspectives, experiences, values and preferences are seldom taken into account when it comes to evaluation, as anticipated in health promotion interventions.

The overall aim of the systematic literature search was to bring attention to the most commonly used health promotion interventions in T2DM, and to provide a deeper understanding of the scope of such interventions and how they are evaluated in order to present quality indicators of good practices.

METHODS

Search strategy

A search strategy was developed and conducted to identify studies that assessed health promotion interventions in patients with T2DM, by a librarian at the Norwegian Directorate of Health. The electronic databases searched were: MEDLINE (Ovid), EMBASE, PubMed, Cochrane Database of Systematic Reviews (CDSR), DARE and NHS Economic Evaluation Database (EED). Various combinations of the following search terms and Medical Subject Headings (MeSHs) were used:

- for type 2 diabetes: Diabetes Mellitus, Type 2 (MeSH) OR Diabetes Mellitus, Maturity Onset (MeSH) OR Diabetes Mellitus, Adult Onset OR Diabetes Mellitus, Slow Onset OR Diabetes Mellitus, Stable OR Diabetes Mellitus, Non Insulin OR DM2 OR NIDDM OR Non Insulin Dependent Diabetes Mellitus OR Non Insulin Dependent Diabetes Mellitus Type 2 OR Diabetes Insulin Independent OR Mellitus OR Chronic Disease (MeSH) OR Chronic illness OR Chronic Ill OR Chronic Sick;
- for health promotion intervention: Benchmarking (MeSH) OR Benchmarking Practice OR Benchmarking Analysis OR Health Promotion (MeSH) OR Health Promotion Model OR Health Campaign (MeSH) OR Program Evaluation (MeSH) OR Program Model OR Program Method OR Program Measure OR Program Analyses OR Program Question OR Program Review OR Program Effectiveness OR Program Efficacy OR Program Sustainability OR Program Appropriateness OR Program Feasibility OR Wellness Program.

All articles published in English, Norwegian, Swedish and Danish from January, 2010 through March, 2015, with at least one search term from each of the categories mentioned in bullet points above, were included for consideration. No additional sources *i.e.* cross-matching reference lists and forward citation search were sought. A full record of the systematic literature search can be found in Appendix I (available online as Supplementary Material at www.iss.it/anna).

Study selection and eligibility criteria

Qualitative, quantitative or mixed method systematic reviews, meta-analyses, guidelines, review articles, narrative syntheses, HTAs and policy statements that evaluated non-pharmacological health promotion interventions in patients with T2DM were considered eligible, as well as the following inclusion criteria:

- participants: studies where the majority, or all of the patients had T2DM; age ≥ 18 years;
 - types of interventions: non-pharmacological health promotion interventions, initiatives, strategies, programs, activities and projects that could be defined as health promotion according to the Ottawa Charter for Health Promotion. Interventions were considered eligible for inclusion if they consisted of one or a combination of the following components, provided individually, in a group, or by telemedicine: Dietary and/or physical activity education; self-management education; psychological and behavioural support; restructuring and/or re-education of health care professionals; initiatives to increase the quality of health professionals' care or health care systems; new and intelligent use of clinical information systems; regular publication and revision of local health promotion strategies and quality indicators; increased usage of community resources and cooperation to promote health where patients live; and interventions that aim for an increased partnership across local sectors to promote health;
 - setting: studies considered relevant were conducted in Europe, North America or Oceania, in primary and/or secondary care, within local communities – urban or districts – or as part of national strategies. Studies had to define a practice that incorporated environmental, organizational, social, economical, educational, individual, and/or local context of the target population.
- Exclusion criteria entailed: unpublished articles and conference abstracts; studies based on a pay-for-performance, computational- and model structure; studies evaluating prevention strategies, surgical and pharmacological interventions; experimental studies and epidemiological investigations; studies where participants had personality disorders, and studies that did not report evaluation- or quality criteria of the intervention.

Data extraction

Two reviewers independently assessed titles and abstracts of all the relevant publications and made decisions on inclusion. Discrepancy in opinion was discussed and no third party was required in the process of study selection. Full-texts were sought and read for all articles that met the inclusion criteria (except one study that was unavailable in full text [5]). In the case of duplicate reports related to the same study, both articles were evaluated to extract the maximum amount of information.

Data was extracted by one author, and checked for accuracy by a second investigator. For each article design, authors and year of publication, as well as type of intervention, evaluation method and reported quality criteria were extracted.

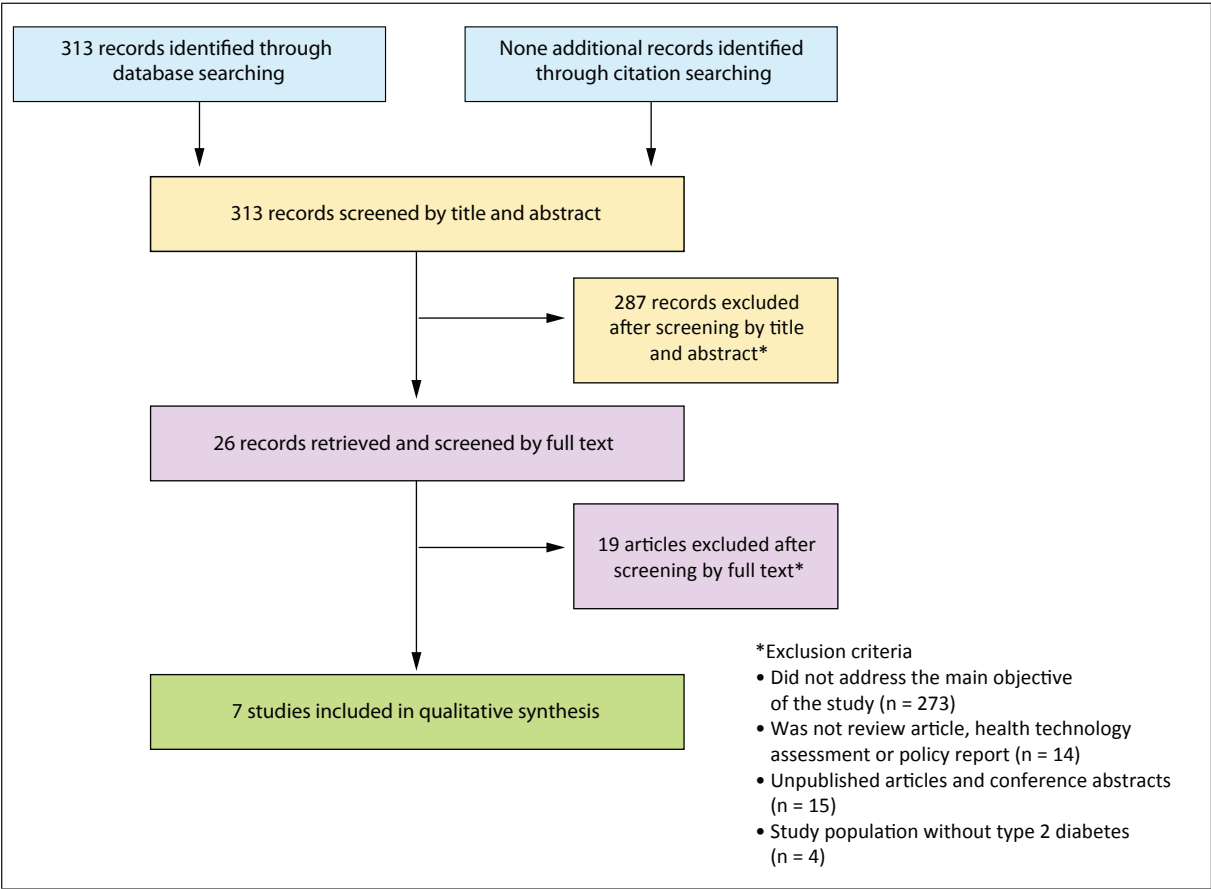


Figure 1
Study eligibility flow chart.

RESULTS

Of the 313 articles screened by title and abstract, seven were identified as being relevant for inclusion [5-11]. The reasons for excluding 306 studies fell within four main criteria as outlined in *Figure 1*. Two hundred and seventy-three publications were immediately rejected as they did not address health promotion interventions in T2DM. Additional 19 studies were excluded as they did not meet our inclusion criteria on study design, patient population and geographical location [12-30].

Table 1 presents the characteristics of the included studies and provides a detailed description of the health promotion interventions as described by the study authors. The seven final studies were published between 2010 and 2015 and consisted mainly of articles performing a review of the literature. Initiatives from the included articles target and evaluate health care professional reorganization and education, collaborative partnerships, communities, policymakers, patients, and technological applications and platforms. A range of approaches to reach quality improvement were reported, such as outreach cardiac specialist services, utilisation of multidisciplinary teams, education of health care professionals and evaluation of technology applications.

The most frequent type of health promotion intervention detected was initiatives that targeted health care professionals. In fact, in five out of seven stud-

ies health care professionals were the only, or one of several target groups [7-11]. The health promotion interventions targeting health care professionals were delivered with an emphasis on multidisciplinary teams [7], improvement models to change practice [8], projects aiming to increase health care professionals adherence to clinical practice guidelines [9], workforce development [10], quality improvement programmes in primary care [11] and education of health care professionals [11].

Mainly, structure and process indicators were reported in the evaluation of the health promotion interventions. The structure and process indicators encompassed use, or change in use of: health care services [9-11]; screening [9, 10]; clinical variables [8]; medication use [9]; and provision of the care- or programme processes [6, 8, 10, 11]. Only one eligible study emphasized patients' clinical outcome variables as an evaluation indicator [7].

Overall, the main ambition of the programs was to increase the collaboration between health care professionals and patients, and between health care centres and program managers and community stakeholders. This was reported as community engagement and self-governance by culturally adjusted disease self-management education [6], continuous quality improvement of health centres system efficiency and system development through increased dialog with health care

**Table 1**

Characteristics of the included studies and summary of findings (interventions and evaluation criteria reflects the description made by the study authors)

First author, year of publication and type of study	Type of health promotion intervention	Description of intervention	Indicator, measurements or evaluation criteria reported
Oldenburg <i>et al.</i> , 2015 [5]. Review	Telemedicine/ Initiatives targeting communities	Technology applications and platforms-within the new communications landscape-to improve the prevention and management of lifestyle-related chronic diseases in the future. This review summarizes key lessons learned from media and communications interventions' design, implementation, and evaluation conducted in the 1970s and 1980s. Then, it consider the potential and evidence base for using contemporary technology applications and platforms — within the new communications landscape — to improve the prevention and management of lifestyle-related chronic diseases in the future.	It was not possible to obtain the full text of this article. Hence, the reported indicators are unknown.
Tibby <i>et al.</i> , 2010 [6]. Review	Initiatives targeting systems and local communities	Outreach cardiac specialist services to indigenous communities in rural and remote locations. The approach involves a step-wise process of a) community engagement, b) delivering recovery interventions to improve health outcomes, c) building community capacity to self-manage chronic illness and promoting health and well-being with the aim of d) community self-governance of chronic disease and health promotion.	Key elements of evaluation: Community participation in the program Disease self-management led by local health care workers Community-generated referral Translation of scientific knowledge of disease processes into community understanding Making culturally relevant connections
Bayliss <i>et al.</i> , 2011 [7]. Review	Initiatives targeting health care professionals, systems and patients	Multidisciplinary team approach to chronic kidney disease (CKD), as part of a quality improvement project to decrease the rate of decline in glomerular filtration rate (GFR). Key components of the team care: An educational class Medication therapy management and medication reconciliation Nephrology consultation with medical recommendations on co-morbidities and metabolic abnormalities Screening for depression using the Patient Health Questionnaire (PHQ-9) instrument (with appropriate treatment and/or referral) Dietary assessment with recommendations A comprehensive care plan based on input from all team members was developed for team use and also shared with patients. Patient self-management was specifically encouraged by the multidisciplinary team and included obtaining necessary laboratory tests, keeping home blood pressure and/or home blood sugar logs.	Primary outcome: Change in GFR Secondary outcomes: LDL-cholesterol HbA1c Percent time at goal blood pressure
Gardner <i>et al.</i> , 2011 [8]. Review	Initiatives targeting health care professionals, systems and policymakers	Systematic continuous quality improvement model to change professional practice in remote communities. Requirements for supporting continuous quality improvement (CQI) were identified. Key features of the Audit and Best Practice for Chronic Disease (ABCD) model include: Assessment of clinical performance across the scope of best practice for chronic disease care Conduction of a structured assessment of health centre systems to support best practice Facilitation of dialogue with health centre staff for interpreting results Determining priorities, setting goals and planning action Engagement of policy and program managers, researchers, clinicians and service providers into a broader CQI network	A range of process, impact and intermediate outcome data were collected routinely by the project participants and entered into a web-based data system which allows for practices to compare their results with other de-identified services in the region. The data include qualitative data from structured reports on health centre progress, and clinical audit and systems development data which are used to assess changes in the quality of health centre systems and clinical indicators (more information on the study methods is available from the study protocol).

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First author, year of publication and type of study	Type of health promotion intervention	Description of intervention	Indicator, measurements or evaluation criteria reported
Thomas <i>et al.</i> , 2011 [9]. Review	Initiatives targeting health care professionals and systems	<p>Provider-focused quality improvement project to increase primary care provider adherence to clinical practice guidelines. The project included 46 primary care providers, physicians, and nurse practitioners, in a state-wide federally qualified health centre that operates 12 comprehensive primary care sites.</p> <p>Key components: The 12-week provider focused quality improvement project sought to (1) increase primary care provider adherence to clinical practice guidelines in the treatment and control of BP among adults with CKD and diabetes mellitus by using electronic health records and patient-level feedback (scorecards); (2) increase primary care providers delivery of basic CKD patient education by using electronic health record-based decision support; and (3) assess whether electronic decision support and scorecards changed provider behaviour.</p>	<p>The main outcomes reported:</p> <p>Unique, racially diverse diabetes patient visits</p> <p>CKD screening, diagnosis, and use of angiotensin-converting enzyme inhibitor/angiotensin-receptor blocker</p> <p>CKD basic education and ancillary service provider use when the provider was aware of the diagnosis or used electronic health record enhancements</p>
Comino <i>et al.</i> , 2012 [10]. Systematic review	Initiatives targeting health care professionals, systems, policymakers and patients	<p>A review of effective strategies to enhance access to best practice processes of primary health care in three domains: chronic disease management, prevention and episodic care.</p> <p>The evaluated interventions tested a range of strategies either singly or as a combination of two or more strategies, targeting both health care providers and patients. The initiatives consisted of: practice re-organisation, patient support, provision of new services, workforce development, and financial incentives.</p>	<p>The main outcomes reported were:</p> <p>Changes in service use</p> <p>Provision of care processes such as evidence based screening, enhanced follow up or continuity of care, use of alternate services, and reduced waiting times</p>
Harris <i>et al.</i> , [11] (2015). Mixed-method evaluation	Initiatives targeting health care professionals and systems/ Health education	<p>An evaluation of a quality improvement and innovation partnership learning collaborative.</p> <p>The purpose of the program was to educate, train, and enable primary healthcare teams in the Plan-Do-Study-Act (PDSA) methodology hereby, to improve chronic disease management and outcomes of the population they serve by providing effective, efficient, accessible, comprehensive, and patient-centred, team-based health care. The program targeted T2DM management, access to care, and team functioning.</p>	<p>Primary outcomes:</p> <p>The proportion of patients with an annual foot exam</p> <p>HbA1c value of patients above study target ($\geq 7.3\%$) at baseline</p> <p>The program evaluation included:</p> <p>Development of a logic model of process evaluation of the program</p> <p>A cluster, matched-control, pre-post chart audit on the management of T2DM</p> <p>A controlled post-only survey of practices participating in the chart audit on advanced access to healthcare</p> <p>Semi-structured, post-only, in-depth telephone interviews</p> <p>Post-only web-based participant survey</p> <p>Health administrative data analysis</p>

The references cited within the table appear also in the reference list of this paper. To facilitate the reading they are reported below:

[5] Oldenburg B, Taylor CB, O'Neil A, Cocker F, Cameron LD. Using new technologies to improve the prevention and management of chronic conditions in populations. *Annu Rev Public Health* 2015;36:483-505.

[6] Tibby D, Corpus R, Walters DL. Establishment of an innovative specialist cardiac indigenous outreach service in rural and remote Queensland. *Heart Lung Circ* 2010;19:361-6.

[7] Bayliss EA, Bhardwaja B, Ross C, Beck A, Lanese DM. Multidisciplinary team care may slow the rate of decline in renal function. *Clin JAM Soc Nephrol* 2011;6:704-10.

[8] Gardner K, Bailie R, Si D, *et al.* Reorienting primary health care for addressing chronic conditions in remote Australia and the South Pacific: review of evidence and lessons from an innovative quality improvement process. *Australian J Rural Health* 2011;19:111-7.

[9] Thomas B. Improving blood pressure control among adults with CKD and diabetes: provider-focused quality improvement using electronic health records. *Adv Chronic kidney Dis* 2011;18:406-11.

[10] Comino E, Davies G, Krastev Y, *et al.* A systematic review of interventions to enhance access to best practice primary health care for chronic disease management, prevention and episodic care. *BMC Health Serv Res* 2012;12:415.

[11] Harris SB, Green ME, Brown JB, *et al.* Impact of a quality improvement program on primary healthcare in Canada: A mixed-method evaluation. *Health Policy (Amsterdam, Netherlands)* 2015;119:405-16.

staff and program managers [8], or increased partnership learning collaborative to improve chronic disease management [11], development of patient feedback possibilities and tools for shared decision support [9],

and reorganization of services and work force development [9]. Lastly, use of technological applications and platforms were suggested to improve prevention, management, monitoring, and quality of communication

between patients with lifestyle-related chronic diseases and practitioners [11].

DISCUSSION

Health promotion in T2DM consists of several inter-related, multicomponent and complex interventions targeting patients, health care professionals and policy makers. Our results confirm that the most common health promotion intervention in T2DM is initiatives targeting health care professionals. Evaluation methods to assess the population based impact of these programs in the world of busy, understaffed public health clinics, diverse health systems, or community settings are limited. Applicable quality indicators of health promotion initiatives pay attention to the representativeness of settings and context of the target population, covering among others, socio-economy, health literacy, different levels of disease determinants, organization of health care, and the economical promoters in the community. By taking into consideration these variables and limitations, the external validity of interventions could be increased and give solid advises to policy makers and program initiators when developing strategies to improve community or national health.

Table 1 shows the evaluation criteria and indicators reported from the selected studies. These characteristics must be interpreted with caution, as they by no means give the full picture of indicators used in health promotion interventions. One of the limitations of this investigation is that we restricted our search to review articles in order to cover our primary goal of getting a brief overview of initiatives that target not only the patients, but also engage health care professionals, policy makers and local society. An implication of this is that the generalisability of findings may be restricted to very specific populations and regional settings.

Medical and economical effects of health promotion initiatives are commonly reported in observational studies, however incorporation of primary research was beyond the scope for this article. Well written examples of the possible impact of a quality improvement project and the lessons learned from implementing quality in-

dicators in primary care are reported by Mata-Cases et al [27] and Bodicoat et al [30], who presents the results from a fifteen year continuous quality improvement program in type 2 diabetes mellitus in primary care in Catalonia, Spain (the GEDAPS program).

On the other hand, strict inclusion- and exclusion criteria are strengths of this work. Interventions targeting people with diabetes with the intention to increase quality of care lacking the health promotion perspective of defining and attending local context, were dismissed.

In conclusion, this literature search identified the most common health promotion interventions in diabetes reported in review articles and policy statements. More research on the long term effectiveness of complex intervention strategies is needed, and will merit rigorous evaluation to aid implementation in other contexts. Making necessary local adjustments considering an intervention's overall public health impact and take local decisions about its own challenges and resources, communities may aim for increased effectiveness of their health care services.

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Conflict of interest statement

There are no potential conflicts of interest or any financial or personal relationships with other people or organizations that could inappropriately bias conduct and findings of this study.

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